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IAZARD	COMMUNICATION DATA	HAZARD COMMUNICATION DATA

# <u>UCISCO</u>

A LINDE SERVICE COMPANY

# HAZARD COMMUNICATION DATA

NOTICE:

Make certain that the information contained in this envelope reaches each person who may use or come in contact with the products and services covered herein.

THIS EN	ELOPE CONTAINS:
	NITROGEN SERVICES HAZARD DATA
	SANDJET® SERVICES HAZARD DATA
	mini-SANDJET® SERVICES HAZARD DATA
<del></del>	UCAR® INTERNAL PIPELINE COATING SERVICES HAZARD DATA
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# FOR ADDITIONAL INFORMATION CONTACT

**HER 01933** 

IAZARD COMMUNICATION DATA

OR UCISCO, 222 PENNBRIGHT, HOUSTON, TEXAS 77090 (713) 872-2100

TAZARD COMMUNICATION DATA HAZARD COMMUNICATION DATA

# MATERIAL SAFETY DATA SHEET

L-4630-E December 1992



An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.

(Essentially similar to US Department of Lebor Form OMB No. 1218-0072)

Do Not Duplicate This Form Request on Original.

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PRODUCT	Nitrogen (Cryogenic Liquid)		
CHEMICAL NAME	Nitrogen	SYNONYMS	Not applicable
FORMULA	N <sub>2</sub>	CHEMICAL FAMILY	Not applicable
		MOLECULAR WEIGHT	28.01

TRADE NAME

Liquid Nitrogen

# II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Data Safety Sheets. See Section IX.

MATERIAL (CAS NO.)	Wt (%)	1992-1993 ACGIH TLV-TWA (OSHA-PEL)	
Nitrogen (7727-37-9)	100	Simple asphyxiant (None currently established)	

BOILING POINT, 760 mm. Hg	-195.8°C (-320.4°F)	FREEZING POINT	-210°C (-345.8°F)
SPECIFIC GRAVITY (H20 = 1)1	. 0.808 @ ~195.8°C	VAPOR PRESSURE AT 20°C.	Gas
VAPOR DENSITY (air = 1)	0.967	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl acetate = 1)	High

APPEARANCE AND ODOR Colorless, odorless liquid.

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# **EMERGENCY PHONE NUMBER**

IN CASE OF EMERGENCIES involving this material, further information is available at all times:

Call CHEMTREC 800-424-9300 only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals. For routine information contact your supplier.

This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

Praxair requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

PRAXAIR, INC.

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L-4630-€



# IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II.

### **EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:**

SWALLOWING-Frostbite may result from contact with liquid.

SKIN ABSORPTION—No evidence of adverse effects from available information.

**INHALATION**—Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting and unconsciousness. Lack of oxygen can cause death.

SKIN CONTACT-No harmful effect expected from vapor. Liquid may cause frostbite.

EYE CONTACT—No harmful effect expected from vapor.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: Contact with liquid may cause frostbite.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of the material do not suggest that overexposure is likely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None currently known.

### **EMERGENCY AND FIRST AID PROCEDURES:**

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN CONTACT—For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

INHALATION—Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

**EYE CONTACT**—In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

NOTE TO PHYSICIAN: There is no specific antidote. Treatment should be directed at the control of symptoms and the clinical condition.

PRODUCT: Nitrogen (Cryogenic Liquid)

L-4630-E December 1992

# V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)

Not applicable

AUTOIGNITION TEMPERATURE

Not applicable:

FLAMMABLE LIMITS IN AIR, % by volume

LÓWER

Not applicable

UPPER

Not applicable

EXTINGUISHING MEDIA: Nitrogen cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately deluge containers with water spray from maximum distance until cool. Move containers away from fire area if without risk. Do not discharge water sprays into Liquid Nitrogen.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Liquid or vapor cannot catch fire. Closed container may rupture due to heat of fire. Liquid Nitrogen will freeze water rapidly. Containers are provided with pressure-relief devices that are designed to vent the contents when they are exposed to elevated temperatures. Liquid causes cryogenic "burns" (frostbite-like injury; see Section IV).

# VI. REACTIVITY DATA

STABILITY

CONDITIONS TO AVOID: Heat (see Section IX).

UNSTABLE	STABLE	
	Х	

INCOMPATIBILITY (materials to avoid): None currently known.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION		
May Occur Will not Occur		
	×	

CONDITIONS TO AVOID: None currently known.

# VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Immediately evacuate personnel from danger area. Allow spilled liquid to evaporate. Shut off leak if without risk. Move leaking assembly to ventilated area or ventilate area of leak. Use self-contained breathing apparatus where needed. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

WASTE DISPOSAL METHOD: Slowly release into atmosphere outdoors.

L-4630-E December 1992

# VIII. SPECIAL PROTECTION INFORMATION

**RESPIRATORY PROTECTION** (specify type): None required under normal use. However, air supplied respirators are required while working in confined spaces with this product. The respiratory protection use must conform with OSHA rules as specified in 29 CFR 1910.134.

LOCAL EXHAUST—Use local exhaust system, if necessary, to prevent the build up of an oxygen deficient atmosphere.

**VENTILATION** 

MECHANICAL (general) - Acceptable

SPECIAL -- None

OTHER-None

PROTECTIVE GLOVES: Loose-fitting cryogenic gloves.

EYE PROTECTION: Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

# IX. SPECIAL PRECAUTIONS

WARNING: Extremely cold liquid and gas. Contact with liquid or cold gas causes severe frostbite. Vapor can cause rapid suffocation due to oxygen deficiency. Protect containers against physical damage. Store and use with adequate ventilation. Close valve when not in use and when empty. Use piping and equipment adequately designed to withstand pressures and temperatures to be encountered. Do not get liquid in eyes, on skin or clothing.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Be sure to read and understand all labels and other instructions supplied with all containers of this product.

NOTE: Compatibility with plastics should be confirmed prior to use. For safety information on general handling of compressed gas cylinders, obtain a copy of pamphlet P-1, "Safe Handling of Compressed Gas in Containers," pamphlet P-12, "Safe Handling of Cryogenic Liquids," and pamphlet P-9, "The Inert Gases, Argon, Nitrogen and Helium," from the Compressed Gas Association, Inc., 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202.

OTHER HANDLING AND STORAGE CONDITIONS: Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.



### **GENERAL OFFICES**

Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113

# MATERIAL SAFETY DATA SHEET

L-4631-D December 1992



An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.

(Essentially similar to US Department of Labor Form OM8 No. 1218-0072)

(Essentially similar to US Department of Labor Form OM8 No. 1218-0072)

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	ı	PRODUCT IDENTIFICATION
PRODUCT	Nitrogen	
CHEMICAL NAME	Nitrogen	SYNONYMS Not applicable
FORMULA	N <sub>2</sub>	CHEMICAL Not applicable FAMILY
		MOLECULAR 28.01

TRADE NAME Nitrogen

# II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Data Safety Sheets. See Section IX.

MATERIAL (CAS NO.)	Wt (%)	1992-1993 ACGIH TLV-TWA (OSHA-PEL)	
Nitrogen (7727-37-9)	100	Simple asphyxiant (None currently established)	
	i	1	

	III. PHYSI	CAL DATA	
BOILING POINT, 760 mm. Hg	-195.8°C (-320.46°F)	FREEZING POINT	-210°C (-345.8°F)
SPECIFIC GRAVITY (H2O = 1)	1. Gas	VAPOR PRESSURE AT 20°	C. Gas
VAPOR DENSITY (air = 1)	0.967	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Buty! acetate = 1)	Not applicable

APPEARANCE AND ODOR Colorless, odorless gas at normal temperature and pressure.

# **EMERGENCY PHONE NUMBER**

IN CASE OF EMERGENCIES involving this material, further information is available at all times:

Call CHEMTREC 800-424-9300 only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals. For routine information contact your supplier.

This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

Praxair requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

PRAXAIR, INC.

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# IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II.

# EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

SWALLOWING-This product is a gas at normal temperature and pressure.

SKIN ABSORPTION—No evidence of adverse effects from available information.

INHALATION—Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting and unconsciousness. Lack of oxygen can cause death.

SKIN CONTACT-No harmful effect expected from vapor. Liquid may cause frostbite.

EYE CONTACT—No harmful effect expected from vapor.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: Contact with liquid may cause frostbite.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of the material do not suggest that overexposure is likely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None currently known.

### **EMERGENCY AND FIRST AID PROCEDURES:**

SWALLOWING-This product is a gas at normal temperature and pressure.

SKIN CONTACT—For exposure to liquid, immediately warm frostbite area with warm water (not to exceed 105°F). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

INHALATION—Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

EYE CONTACT—In case of splash contamination, immediately flush eyes thoroughly with water for at least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

NOTE TO PHYSICIAN: There is no specific antidote. Treatment should be directed at the control of symptoms and the clinical condition.

NOTE: Suitability for use as a component in underwater breathing gas mixtures is to be determined by or under the supervision of personnel experienced in the use of underwater breathing gas mixtures and familiar with the effects, methods, frequency and duration of use, hazards, side effects and precautions to be taken.

PRODUCT: Nitrogen

L-4631-D December 1992

FLAMMABLE LIMITS IN AIR, % by volume	LOWER	Not applicable	UPPER	Not applicable
FLASH POINT (test method)	Not applicable	AUTOIGNITION TEMPERATURE		Not applicable
	V. FIRE A	ND EXPLOSION HAZ	ZARD DATA	

EXTINGUISHING MEDIA: Nitrogen cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately deluge containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Gas cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are designed to vent contents when they are exposed to elevated temperature.

# STABILITY CONDITIONS TO AVOID: See Section IX. UNSTABLE STABLE X

INCOMPATIBILITY (materials to avoid): Under certain conditions, nitrogen can react violently with lithium, neodymium, titanium, ozone.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS PO	DLYMERIZATION	CONDITIONS TO AVOID: None currently known.
May Occur	Will not Occur	·
	×	

# VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move leaking container to well-ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

WASTE DISPOSAL METHOD: Slowly release into atmosphere. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

# VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): None required under normal use. However, air supplied respirators are required while working in confined spaces with this product. The respiratory protection use must conform with OSHA rules as specified in 29 CFR 1910.134.

LOCAL EXHAUST—Use local exhaust system, if necessary, to prevent the build up of an oxygen deficient atmosphere.

**VENTILATION** 

MECHANICAL (general) - Acceptable

SPECIAL-None

OTHER-None

PROTECTIVE GLOVES: Preferred for cylinder handling.

EYE PROTECTION: Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

# IX. SPECIAL PRECAUTIONS

CAUTION: High pressure gas. Use piping and equipment adequately designed to withstand pressures to be encountered. Can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use and when empty.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death. Be sure to read and understand all labels and other instructions supplied with all containers of this product. For safety information of general handling of compressed gas cylinders, it is recommended that a copy of pamphlet P-1, "Safe Handling of Compressed Gas in Containers," be obtained from the Compressed Gas Association, Inc., 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202.

OTHER HANDLING AND STORAGE CONDITIONS: Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.



**GENERAL OFFICES** 

Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113



# SAFETY PRECAUTIONS

# **FOR**

# **NITROGEN**

Nitrogen is a stable, colorless, odorless gas. Nitrogen makes up about 78 percent of the atmosphere.

# WARNING

Nitrogen can cause rapid asphyxiation and death if released in confined, poorly ventilated areas.

Nitrogen as a liquid or a cold gas may cause severe frostbite to the skin or eyes. Do not touch frosted pipes or valves with bare skin.

Use a pressure-reducing regulator when withdrawing gaseous nitrogen from a cylinder or other high-pressure source.

# **KEEP EQUIPMENT AREA WELL VENTILATED**

Nitrogen is non-toxic, but it can cause rapid asphyxiation in a confined area without adequate ventilation by diluting the oxygen concentration in the air to dangerously low levels. Nitrogen may replace normal air without warning that a non-life supporting atmosphere is developing. Liquid product is of special concern, because a small amount of liquid nitrogen evaporates to create a large amount of gas. Because nitrogen is colorless, odorless and tasteless, it cannot be detected by the human senses. Any atmosphere that does not contain enough oxygen can cause dizziness, unconsciousness, or even death. OSHA regulations define an oxygen deficient atmosphere as one with an oxygen concentration of less than 19.5 percent.

# **CONFINED SPACES**

Never enter any tank, pit other confined area where these gases may be present until it has been purged with air and tested for a breathable atmosphere using a gas analyzer with a 0 to 25% scale. The oxygen content must be between 19.5 and 22 percent. Before entering any equipment that uses nitrogen, be sure all pipes, hoses, or ducts between it and the nitrogen source have been disconnected, blanked or otherwise positively closed off. Closing a valve is NOT a sufficient safety precaution. Monitor the oxygen content of the atmosphere as long as people are in the enclosed space. Persons working in confined spaces must be tethered with litelines, and an observer must be stationed outside the entrance to continuously monitor their reactions. For further advise on confined space entry, obtain a copy of NIOSH publication 87-113, published by the U.S. Department of Health and Human Services.

MOTICE: Make certain that the information on this handout reaches each person who may use or come in contact with the product described on this handout. This product is for use by trained personnel only. Additional copies of this handout are available from your UCISCO representative. Additional safety publications are listed on page 5 of this pamphlet.

### **AVOID CONTACT WITH LIQUEFIED GASES**

Boiling always occurs when a warm container is filled or ambient temperature objects are placed in the liquid. Stand clear of boiling or splashing liquid and wear proper protective clothing. Never touch uninsulated pipes or vessels containing liquid nitrogen or the cold gas issuing from it. Both can cause severe frostbite, and the skin may adhere to the cold surface. Use tongs to lift objects in and out of the liquid nitrogen.

# **PROTECT EYES AND SKIN**

Liquid nitrogen can be extremely cold. About -290 degrees Fahrenheit. Accidental contact with the liquid, or the cold gas issuing from it, may cause severe frostbite to the eyes or skin. Follow these safety guidelines to protect your eyes and skin: Protect your eyes with safety goggles or face shield. Safety glasses without side shields do not give adequate protection. Cover the skin to prevent contact with the liquid or cold gas, or with cold pipes and equipment. Always wear gloves when handling anything that is, or may have been, in contact with the liquid. Special gloves made for cryogenic work are recommended, but leather gloves, without gauntlet that can be quickly and easily removed, may also be used. Long sleeves are recommended for arm protection. Wear cuffless trousers outside boots or over high top shoes to shed spilled liquid.

NEVER USE CONTAINERS, EQUIPMENT, OR REPLACEMENT PARTS OTHER THAN THOSE SPECIFICALLY DESIGNATED FOR USE IN NITROGEN SERVICE.

Be sure all containers, valves, regulators, hoses, etc. are designed for the intended use.

When handling liquid nitrogen, use only containers specifically designed for holding cryogenic liquids. Such containers are made from materials which can withstand the rapid changes and extreme differences in temperature that result. Even these special containers should be filled slowly to minimize the thermal shock. All such containers should be open or protected by a vent or other relief device which permits the vapors to escape without causing a rise in pressure. Inspect vents regularly to be sure that they are not plugged with ice condensed out of the air. Restricted vents can cause pressure build up which could damage or rupture the container.

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# NITROGEN, SAFETY PRECAUTIONS

# **USE PROPER PRESSURE REGULATORS**

Prior to attaching a nitrogen regulator, inspect the regulator very carefully for physical damage or contamination and to ensure that it is properly sized and has the correct pressure rating for the intended service. Never use a damaged regulator.

Before attaching the regulator to withdraw gaseous nitrogen product, crack open the nitrogen supply valve for a moment to blow out any dust or dirt that might have accumulated in the nitrogen valve outlet. Connect the regulator to the valve and back out the pressure adjusting screw until it turns freely. While standing to one side of the regulator, open the nitrogen supply valve very slightly and very slowly to allow the gauge to move up to nitrogen supply pressure. Then, open the nitrogen supply valve all the way.

# EXERCISE CAUTION WHEN DISPOSING OF WASTE GAS OR LIQUID

Gaseous nitrogen should be released only in an open outdoor area. Liquid nitrogen should be discharged into a remote, outdoor, gravel filled pit where it will evaporate safely.

# **FIRST AID**

If symptoms of asphyxia such as headache, drowsiness, dizziness, excitation, excess salivation, vomiting, or unconsciousness are observed, remove the victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Call a physician promptly.

If exposure to cryogenic liquids or cold gases occurs, restore tissue to normal body temperature (98.6 degrees F) as rapidly as possible, then protect the injured tissue from further damage and infection. Call a physician immediately. Rapid warming of the affected part is best achieved by bathing it in warm water. The water temperature should not exceed 105 degrees F, and under no circumstances should the frozen part be rubbed, either before or after rewarming. If the eyes are involved, flush them thoroughly with warm water for at least 15 minutes. In case of massive exposure, remove clothing while showering with warm water. The patient should not drink alcohol or smoke. Keep warm and at rest. Call a physician promptly.

Refer to the Material Safety Data Sheets (MSDS), for detailed descriptions of the symptoms of overexposure and the first aid to be used.

# PIPING SYSTEMS

Working safely with nitrogen requires safe piping systems, proper control equipment, and safe handling of any containers involved. The purpose of this handout is not to discuss cylinder handling or the design of distribution systems. However, a few of the major safety considerations are given below.

Never install equipment or piping for liquid nitrogen or the cold vapors issuing from it, without consulting someone thoroughly experienced in low temperature work. Piping must be of a material suitable for the type, pressure, and temperature of the gas being handled. Remember, certain materials (e.g., carbon steels) lose ductility and impact strength at cryogenic temperatures. Provision must also be made for the enormous increase in volume as a liquefied gas vaporizes. The entire system must be provided with adequate pressure-relief devices: one should be between each pair of valves where liquid nitrogen or cold vapor could be trapped.

PRAXAIR provides Booklet P-14-033, Guidelines for the Design and Installation of Industrial Gaseous Nitrogen / Argon Distribution Piping Systems to assist you with the design and installation of piping systems.

When installing a piping system, you should observe standards published by the National Fire Protection Association. Mark piping in accordance with American National Standards Institute A 13.1, "Scheme for the Identification of Piping Systems," and label all piping with the name of the gas being carried. You should obtain a copy of the appropriate brochures and be sure that your system meets the recommended standards.

When withdrawing gaseous product from a portable cryogenic liquid container with an integral vaporization coil, do not exceed the manufacturer's recommended withdrawal rates for the container. Excessive gas withdrawal rates may result in discharge of liquid or cold gas which can damage equipment into which the product is flowing.

# **IMPORTANT**

Nitrogen has properties that can cause serious accidents, injuries, and even death if proper precautions and safety practices are not followed. Therefore, during handling and use of nitrogen, or during the operation and maintenance of equipment and systems using nitrogen, be certain to follow the applicable safety precautions described in this handout and in the Material Safety Data Sheets, safety standards, and other literature referenced in this handout. Manufacturer's operating instructions for equipment using nitrogen are to be followed exactly.

# **EMERGENCY RESPONSE PLANNING**

The importance of an effective workplace safety program cannot be overemphasized. Proper planning for emergencies can go a long way to minimize employee injury and property damage.

OSHA requires an emergency response plan for each specific workplace that addresses all potential emergencies that can be expected. This plan must be developed and put into written form. A firm with fewer than 10 employees may communicate the plan orally. Refer to OSHA requirements 29CFR 1910.120 and 29CFR 1910.38(a) for more information.

This guide details the basic things that need to be done in preparation for a workplace emergency. It is intended to assist you. It is not intended as a complete and all-inclusive source.

Consult MSDS's for more details on any hazardous product. Check the labels on any containers. Refer to your state, federal, and local guidelines for handling emergencies and hazardous product.

OSHA publishes many helpful materials on planning for emergencies. To find out what materials are available, call the OSHA Publications Office at 202-219-4667.

Check with UCISCO or PRAXAIR for any information you may need on handling our products. To order MSDS's, call 1-800-PRAXAIR.

The text that follows discusses some of the specifics involved in formulating an emergency response plan.

# **PLANNING CONSIDERATIONS**

The type and extent of any emergency depends on many variables including the type of process, the material handled, the number of employees, and the availability of outside resources.

Some factors to consider regarding potential gas emergencies:

র	The type of gas involved (flammable or nonflammable)
<b>(</b>	The degree of confinement in the area where leaks or spills may occur
র্	The capabilities of the ventilation system in the areas where gas is used or stored
প্র	The area to which vapors would be carried in a gas emergency
<b>\( \text{\tin}\exitt{\text{\tin}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tex{\tex</b>	The probability of containment difficulty based on location circumstances
প্র	The potential for human exposure
র্	How an emergency will be recognized by personnel
ব্	For each shift, how many employees would need to be evacuated
ব্	A safe distance away from the plant for evacuated employees
প্র	A location for safe refuge
প্র	Who will take charge of an emergency
প্র	The type of emergency equipment needed
<u>ৰ</u>	Decontamination procedures

# **EMERGENCY RESPONSE PLAN - OSHA REQUIREMENTS**

As a minimum, the plan must include the following elements:

Pre-emergency planning

Emergency recognition and prevention

The preferred means for reporting fires and other emergencies

chain of authority

Evacuation routes and procedures

Safe distances and places of refuge

Procedures to be followed by employees who remain to perform or shut down critical operations before they evacuate

Fire fighting equipment and emergency equipment

emergency medical treatment and first aid

Decontamination

Names or regular job titles of persons or departments to be contacted for further information or explanation of duties under the plan

Critique of response and follow-up

# **PRE-EMERGENCY PLANNING**

The effectiveness of response during emergencies depends on the amount of planning and training performed.

The plan you develop must be reviewed with all employees when it is initially developed and whenever the employee's responsibilities under the plan change or whenever the plan is changed. After a plan is instituted, frequent reviews and updates must be done.

Conduct practice emergency drills so everyone is familiar with the plan and their escape route. These drills should be held at least annually. If possible, Local police and fire departments should participate.

# **EMERGENCY RECOGNITION AND PREVENTION**

OSHA's hazard communication standard requires hazard information to be transmitted by employers to exposed employees. This is to ensure that employees are educated about the hazardous substances in their workplace and are able to recognize what might create a dangerous situation from becoming emergencies and the ability to recognize an emergency when one occurs.

### REPORTING FIRES

Each employee must know how to report and emergency, such as using manual pull box alarms, public address systems, and telephones.

Emergency Phone Numbers should be posted on or near telephones, on employees' notice boards, or in other conspicuous locations. The warning plan should be in writing, and management must ensure that each employee knows what it means and what action is to be taken.

ALARMS should be audible or visible to all people in the plant. All employees need to be alerted to emergencies so that they can evacuate or take other action required in the plan. The alarm should be distinctive and recognizable as a signal to evacuate the work area or perform actions required by the Emergency Response Plan.

# REFERENCE MATERIAL

# MATERIAL SAFETY DATA SHEETS

P-4630	L	iquiđ N	itrogen
P-4631	Gas	eous N	itroaen

# **UCISCO SAFETY PUBLICATIONS AND GUIDELINES**

P-14-033 ...... Guidelines for Design and Installation of Industrial Gaseous Nitrogen and Argon Distribution Piping Systems.

# COMPRESSED GAS ASSOCIATION (CGA) PUBLICATIONS

P-1	Safe Handling of Compressed Gases in Containers
	The Inert Gases, Argon, Nitrogen, and Helium
	Safe Handling of Cryogenic Liquids
	Accident Prevention on Oxygen Rich and Oxygen
	Deficient Atmospheres
SB-2	Oxygen Deficient Atmospheres

# FEDERAL INFORMATION SOURCE

Federal Information Source U.S. Department of Commerce Springfield, VA 22161

NIOSH 87-113 ...... Confined Space Entry
(U.S. Department of Health and Human Services)

# **EMERGENCY ASSISTANCE**

If an emergency arises with a PRAXAIR gas product in the United States, Call:

PRAXAIR Hazardous Materials

Emergency Line

1-800-645-4633

Οr

Chemical Transportation Emergency Center (CHEMTREC) 1-800-424-9300

IN CANADA, CALL THE CANADIAN HELP HOTLINE: (514) 640-6400

All numbers can be called 24 hours a day.

The information on this sheet has been extracted from Praxair Form P-3499

# **UCISCO SALES AND SERVICE CENTERS**

# HOME OFFICE

222 Pennbright
Suite 300
Houston, Texas 77090-5999
(713) 872-2188

### NORTHERN

# **CHICAGO**

P.O. Box 271 2024 North Lafayette Court Griffith, Indiana 46319 (219) 923-0222

### CLEVELAND

Two Summit Park Drive Suite 450 Independence, Ohio 44131 (216) 573-3627

# **PHILADELPHIA**

P.O. Box 1370 111 Connecticut Drive Burlington, New Jersey 08016 (609) 386-4466

# INSTITUTE

Route 25 c/o PRAXAIR Plant P.O. Box 730 Institute, West Virginia 25112-0730 (304) 768-7820

# SARNIA

1274 Lougar Avenue Sarnia, Ontario Canada N7S 5N6 (519) 332-0730

# SOUTHWEST

# LA PORTE

P.O. Box 1248 200 Strang Road La Porte, Texas 77571 1-800-824-7264

### LOUISIANA

3237 S. Burnside Avenue Gonzales, Louisiana 70737-1629 (504) 647-9797

# **TULSA**

1335 West 37th Place Tulsa, Oklahoma 74107 (918) 445-5588

# **WESTERN**

# LOS ANGELES

10829 Etiwanda Fontana, California 92337-6984 (909) 974-5190

# SAN FRANCISCO

1950 Loveridge Road Pittsburg, California 94565 (510) 427-1950

# PACIFIC NORTHWEST

4115 Strider Loop Bellingham, Washington 98226 (360) 734-3955

# UTAH

12385 W. Alternate Highway 50 P.O. Box 306 Magna, Utah 84044 (801) 250-0567

# **EDMONTON**

9020 24th Street Edmonton, Alberta Canada T6P 1X8 (403) 467-9000 HERCULES
MARINE SERVICES CORPORATION

P. O. Drawer O • Freeport, Texas 77541

INVOICE NO.

3271-95

DATE

December 19, 1995

Job No.

4927-1

Location

Freerort

TO:

Dixie Linehaul 7747 Tom Drive Baton Rouge, LA 70806

PLEASE REMIT PAYMENTS TO:

11011 RICHMOND

SUITE 500

**HOUSTON, TX. 77042** 

PO# P7442

Terms

: Net 30

FOR:

Service to SC1904 as follows:

12/11/95

Fill nitrogen bottle

Journey (2)

4 hr.

@ 44.25

4.25 \$177.00

Total

\$177.00

TOTAL AMOUNT DUE

\$177.00

PHONE: (409) 233-6371

# UCISCO, INC.

THE PLAZA AT COMMERCE PARK NORTH 222 PENNBRIGHT, SUITE 300 HOUSTON, TEXAS 77090-5999 (713) 872-2229

# SERVICE AGREEMENT No. 41509

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UCISCO Represent	ative .	l .	u/				_ <del></del>		
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# \*\*\* TRANSMISSION REPORT \*\*\*

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P. O. Drawer O . Freeport, Texas 77541

INVOICE NO. 3271-95

DATE

December 19, 1995

Job No.

4927-1

Location

Free ort

TO: Dixie Linehaul

7747 Tom Drive Baton Rouge, LA 70806 PLEASE REMIT PAYMENTS TO:

11011 RICHMOND SUITE 500 HOUSTON, TX. 77042

Terms

: Net 30

FOL FOR:

Service to SC1904 as follows:

12/11/95

Fill nitrogen bottle

Journey (2)

4 hr.

44.25

\$177.00

Total

\$177.00

TOTAL AMOUNT DUE

\$177.00.

PHONE: (409) 233-6371

Strength th

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**HER 01951** 

# UCISCO, INC.

THE PLAZA AT / 222 PENNBRIGHT, SUHE U. HOUSTON, TEXAS 77090-5999 (713) 872-2225

SLRVIC

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# HERCULES OFFSHORE CO.

MARINE REPAIR MARINE OPERAT	CUSTOMER P.O.
ORDER No 4922_	
12/11/95 ETA 5:30	C Dixie
D ARRIVAL A	S DICLING ADDRESS
T COMPLETION DATE	O CITY AND STATE
DEPARTURE DATE	E MORE MORES
SAIV DARROE W	R O/T AUTHORIZED BY
SC 904	Harvey
	STOCK MATERIAL TYES NO
POREMAN ( Duarte	IF YES, COMPLETE STOCK MATERIAL TRANSFER TICKET
LAST PRODUCT	OUTSIDE SERVICES YES NO
GAS FREEING NO CERTIFICATE REQUIRED NO	
HAUL OUT FOR INSPECTION AND REPAIR YES NO	
ON WAYS DATE:	
ON WAYS DATE:	
ITEM F	NUMBERS
1 Fill nitrogen bottle	
2	
·	
3	
4	· · · · · · · · · · · · · · · · · · ·
6	
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THIS SHALL SERVE AS YOUR AUTHORIZATION TO PROCEED N	WITH THE ABOVE
WITHER SERVE AS A OUR NO HIGHER PORT TO TRUCEED (	respectation of the contraction
Signed:	Date:

# HERCULES OFFSHORE CO. INVOICE NO. MARINE OPERATIONS FACILITY MARINE REPAIR CUSTOMER P.O.\_ C S Ŧ T 0 E M R 906 ☐ YES □NO IF YES, COMPLETE STOCK MATERIAL TRANSFER TICKET OUTSIDE SERVICES IF YES, LIST ☐ YES □ NO GAS FREEING NO CERTIFICATE REQUIRED NO [ HAUL OUT FOR INSPECTION AND REPAIR YES [] NO [] ON WAYS DATE: ON WAYS ITEM NUMBERS 2 3 8 9 10 THIS SHALL SERVE AS YOUR AUTHORIZATION TO PROCEED WITH THE ABOVE.

Signed: \_\_

Date: \_